SOUTH FLORIDA WATER MANAGEMENT DISTRICT

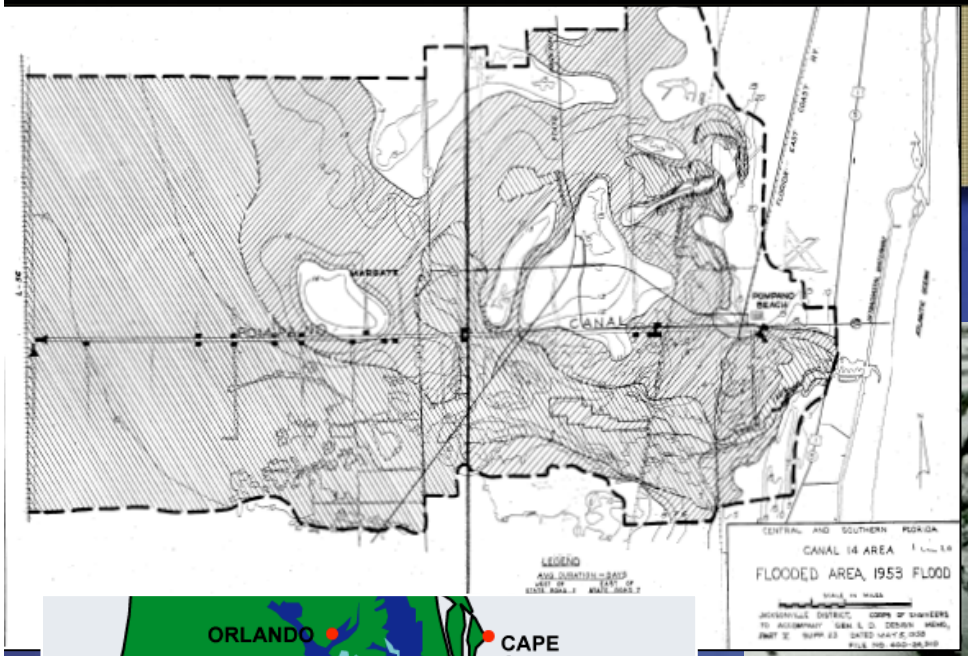
Water Academy- Broward Leaders
Broward County – Operational Information

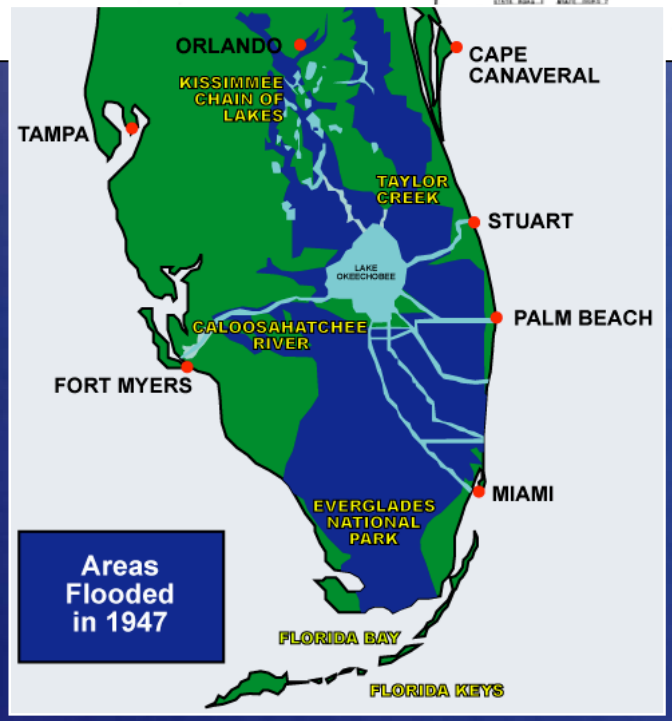
Susan Sylvester – Director, Operations Control Department

October 3, 2008

sfwmd.gov

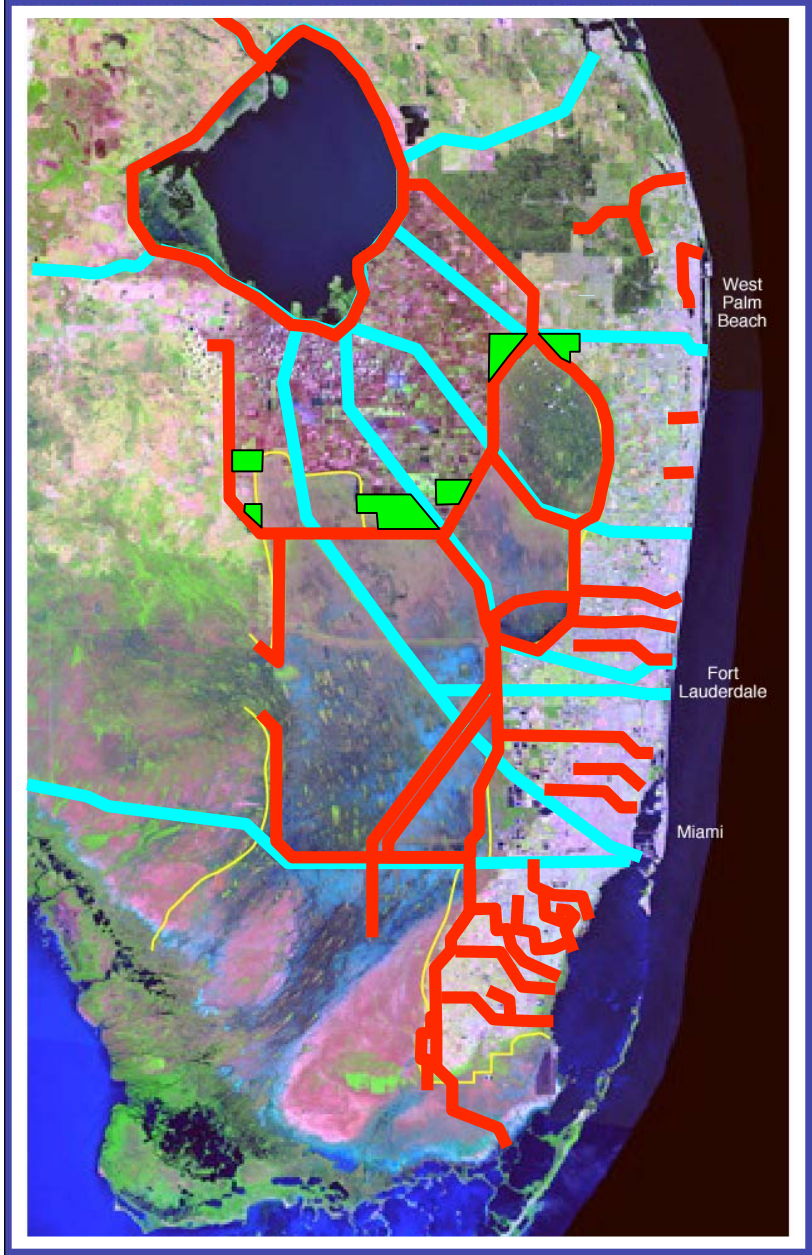
The Entire Region Flooded in 1947, 1950 & 1951






BROWARD - COUNTY - POWER PLANT IN OPERATION EVEN DURING CREST OF FLOOD. ORANGE GROVES IN BACKGROUND RUINED

Chronology of Water Management Changes



Managed System (2003)

Pre-Central & South Florida Projects

- Caloosahatchee/Kissimmee Rivers 1881-93
- East Coast Canals/St. Lucie Canal 1905-24
- Tamiami Trail – 1915-28
- Lake Okeechobee HH Dike – 1932-38

Central & Southern Florida Project

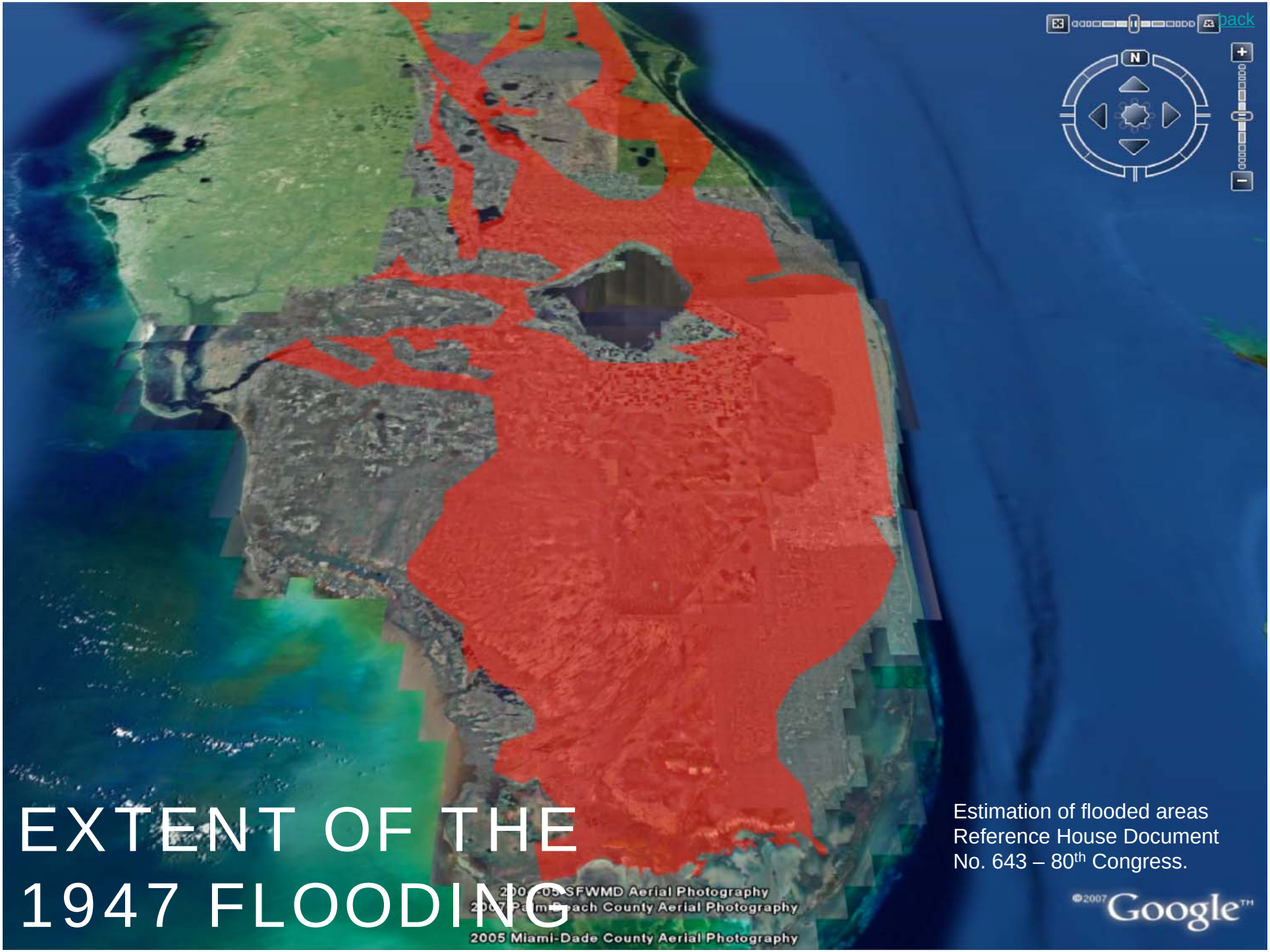
- Eastern Protective Levee System – 1952-54
- Everglades Agricultural Area – 1954-59
- Water Conservation Area Levees – 1960-63
- Lower East Coast Canals – 1954-65
- Lake Okeechobee Levees – 1960-64
- Kissimmee River Channelization – 1962-71
- South Dade System – 1965-83

Everglades Construction Project

- Stormwater Treatment Areas – 1994-2003

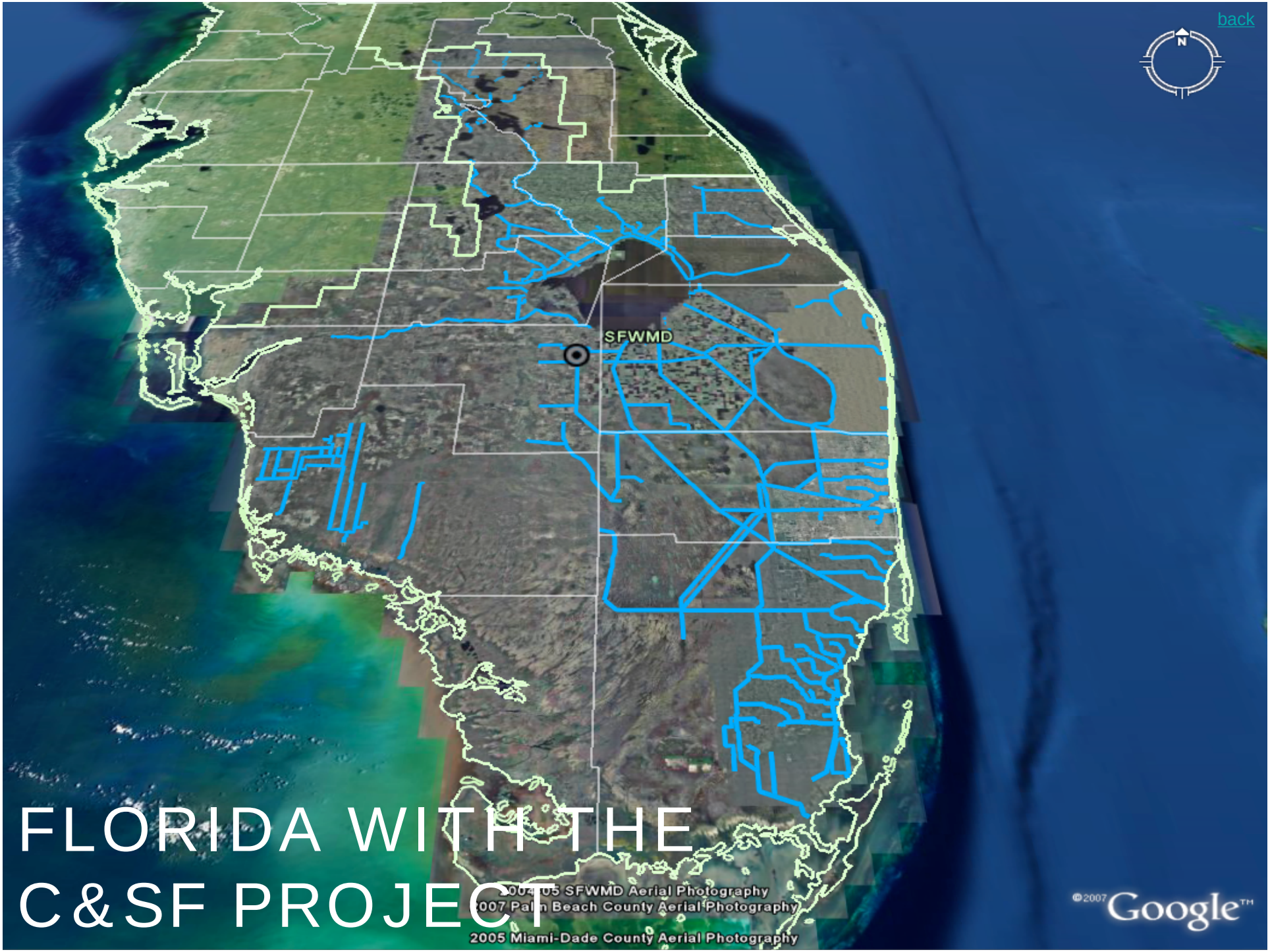
Source: Light and Dineen, 1994; SFWMD & USACE, 2008

FLORIDA WITHOUT THE C&SF PROJECT

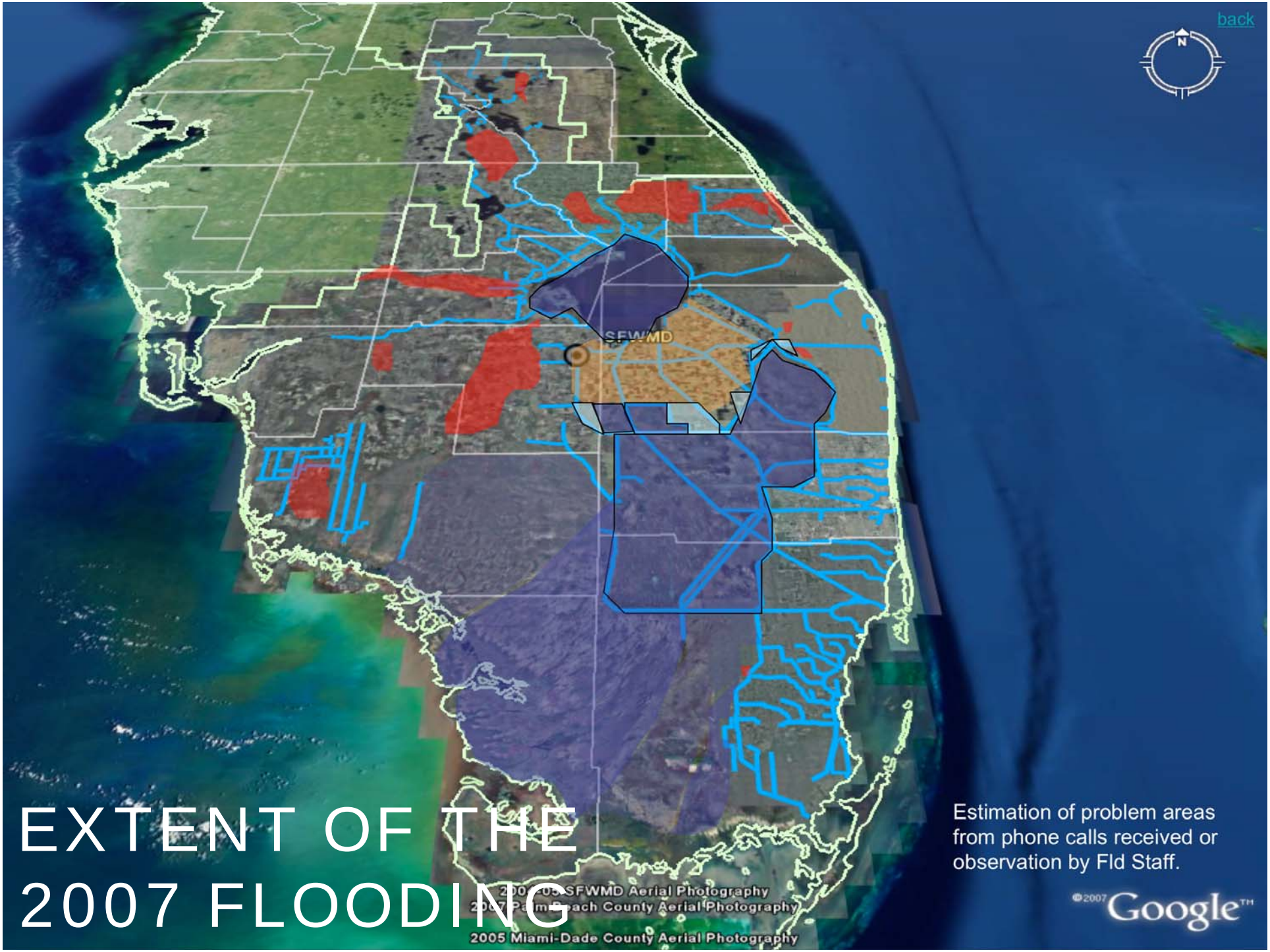


EXTENT OF THE 1947 FLOODING

Estimation of flooded areas
Reference House Document
No. 643 – 80th Congress.



FLORIDA WITH THE C&SF PROJECT


back
N
SFWMD
EXTENT OF THE 2007 FLOODING
Estimation of problem areas from phone calls received or observation by Fld Staff.
2005 SFWMD Aerial Photography
2005 Miami-Dade County Aerial Photography
©2007 Google™

The "Project Purpose"

- **Flood Control**
- **Water Supply**
  - **Agriculture**
  - **Urban**
  - **Everglades National Park**
  - **Saltwater Intrusion**
- **Navigation**
- **Protection of "fish and wildlife"**

Water Management System Components

- **Primary System is more than just the C&SF Project**
- **1,969 miles of canals & levees**
- **160 major drainage basins**
- **501 major structures**
  - **206 remotely operated**
  - **295 manually operated or fixed structures**
- **50 pump stations**
  - **Almost ½ with remote operation capability**

Infrastructure Growth

C&SF Project – Pre-1999

- **Structures (Operable) 303**
- **Pump stations (Original) 18**
- **Pump stations (Added) 12**

Stormwater Treatment Areas

- **Structures 243**
- **Pump stations 21**

C-## – Basin Operations

- Canal levels are regulated by opening and closing of water control structures.
- Structures have automatic controls and opening and closing are determined by headwater levels.
- Canal level optimum generally measured at coastal structure headwater.
- Water is supplied, in so far as possible from WCA-1 via S39 (Hillsboro) & WCA-2 via S-38 (C-14).
- C-11 has Pump station 9 & seepage pump 9A and Obermeyer weir structure S-381

How does SFWMD manage the system?

[FIELD INFRASTRUCTURE (WMFS) + INFORMATION MANAGEMENT (WMIS)] X INFORMATION TECHNOLOGY (ITD) = WATER MANAGEMENT SCADA SYSTEM (WMSS)

Remote Terminal Units (RTUs) –RACUs, MOSCADS, CR10s
Sensors–environmental, structure monitoring
Actuators–pump, gate control
Data acquisition, test, maintenance, problem-tracking systems

Data management/warehousing
Data verification and validation
Quality control/quality assurance
Analysis, Web publishing
Database - DBHYDRO

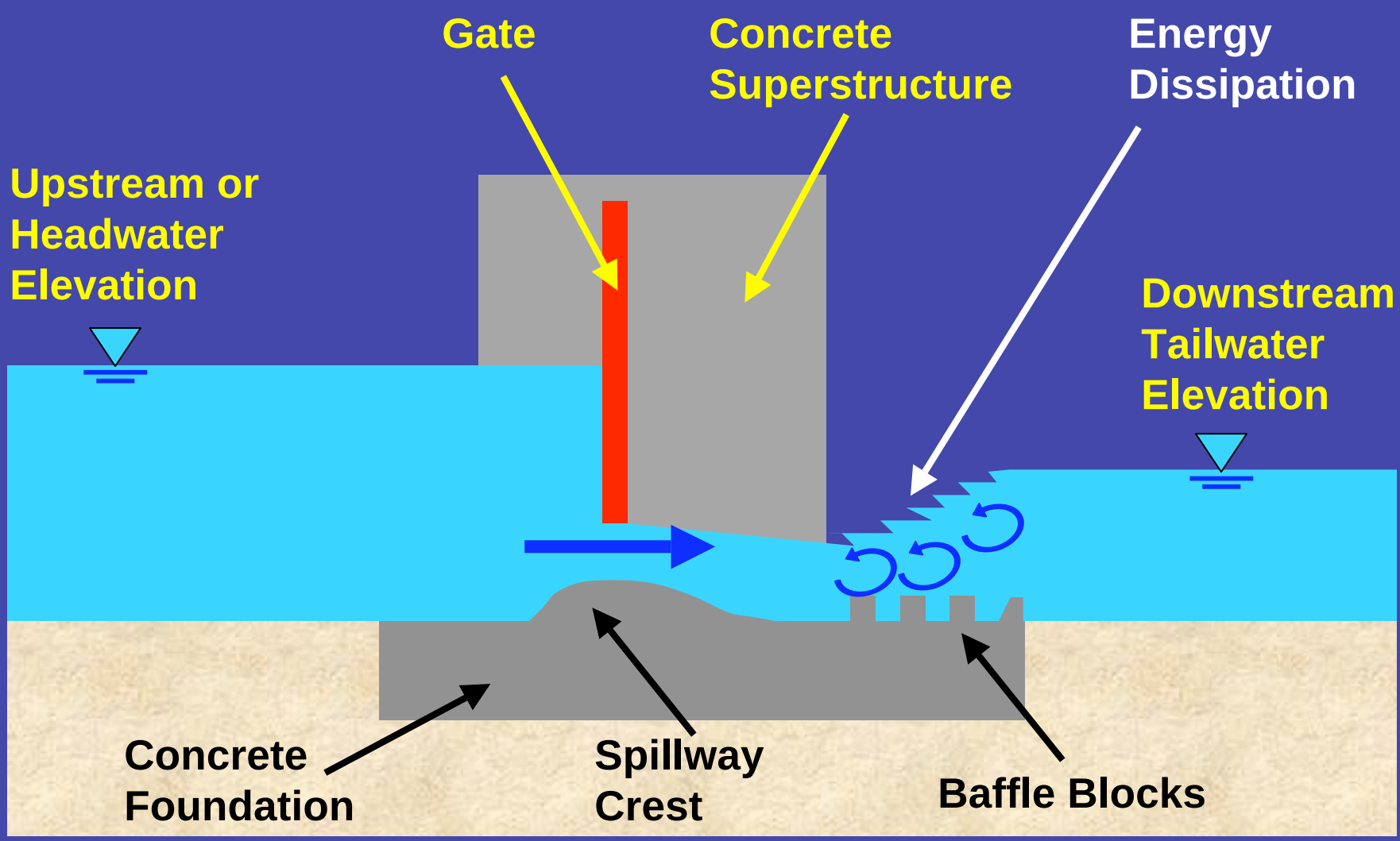
Microwave backbone
Spread-spectrum
RF feeder networks
District WAN interfaces (T1, etc.)

SCADA (Supervisory Control and Data Acquisition)
Software/hardware systems for data acquisition and control
System administration / Software development
Operations Control Center (OCC) staff
Water managers / SCADA technicians
Meteorologists / STA Site Managers

ModComp to Telvent conversion
Operation Decision Support System (ODSS)

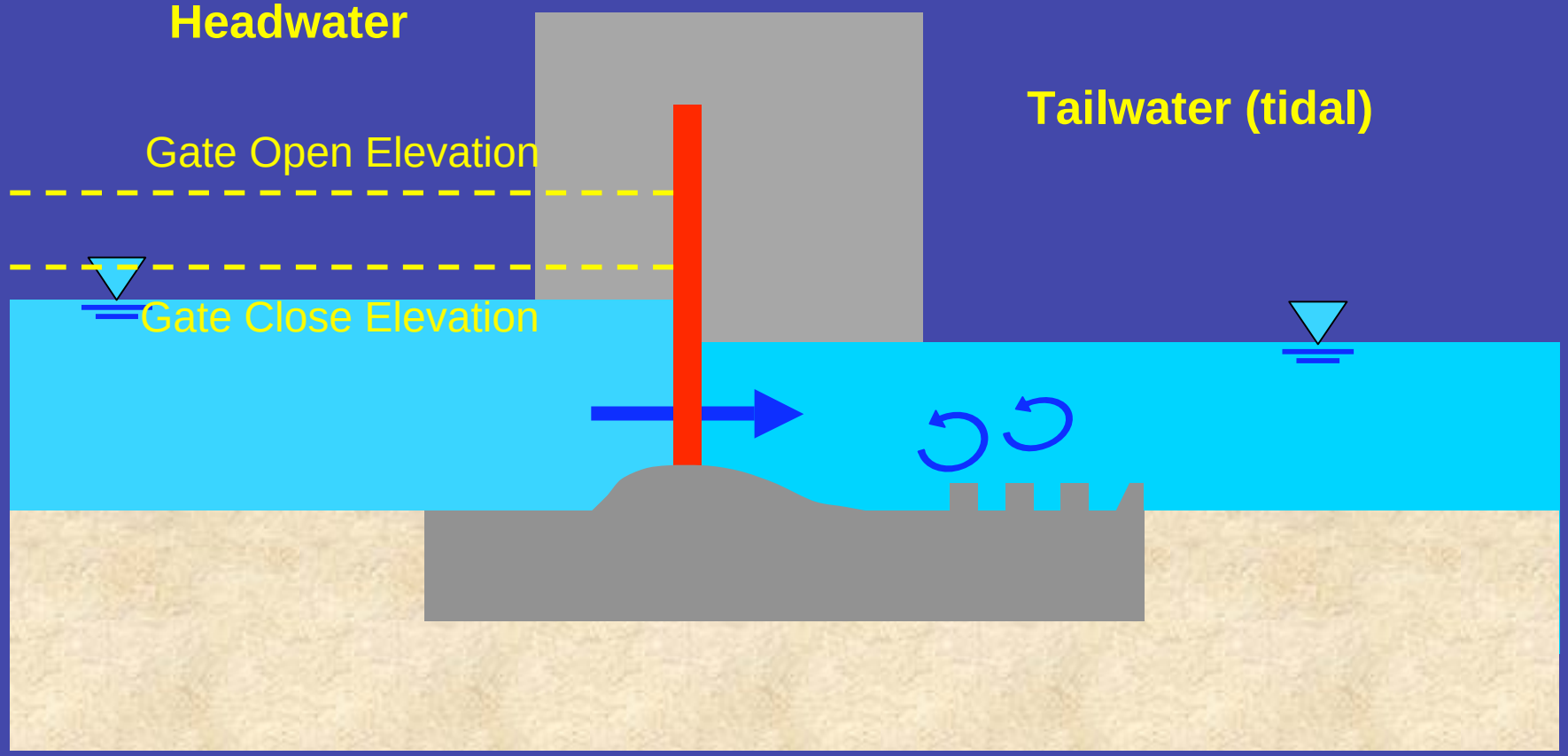
SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Gated Spillway Basics



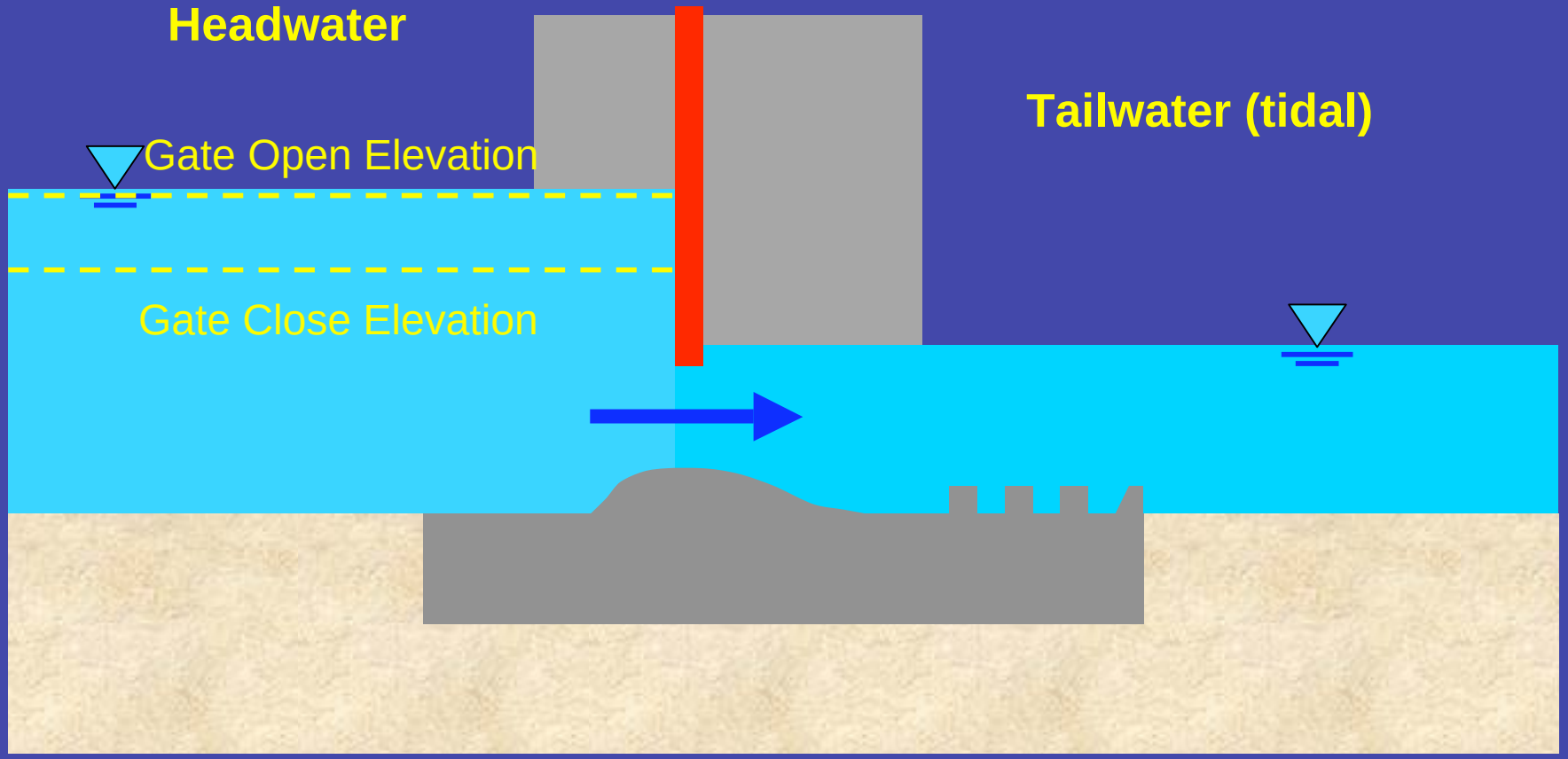
Gated Spillway

(coastal structures)



Gated Spillway

(coastal structures)



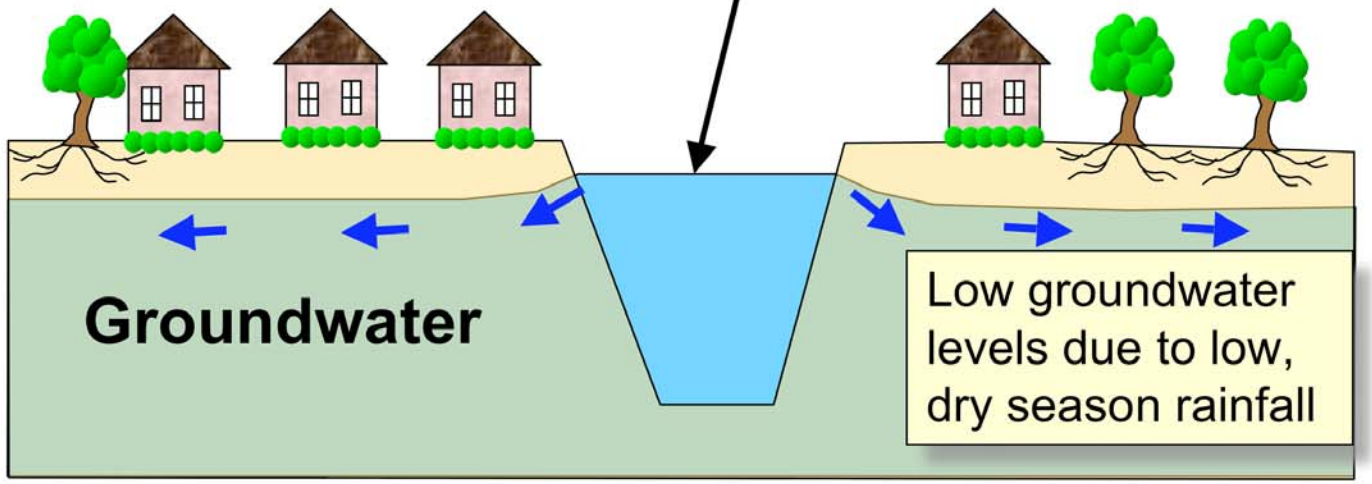
Canal / Groundwater Interaction

Normal Dry Season Operations

Canals serve two primary purposes….

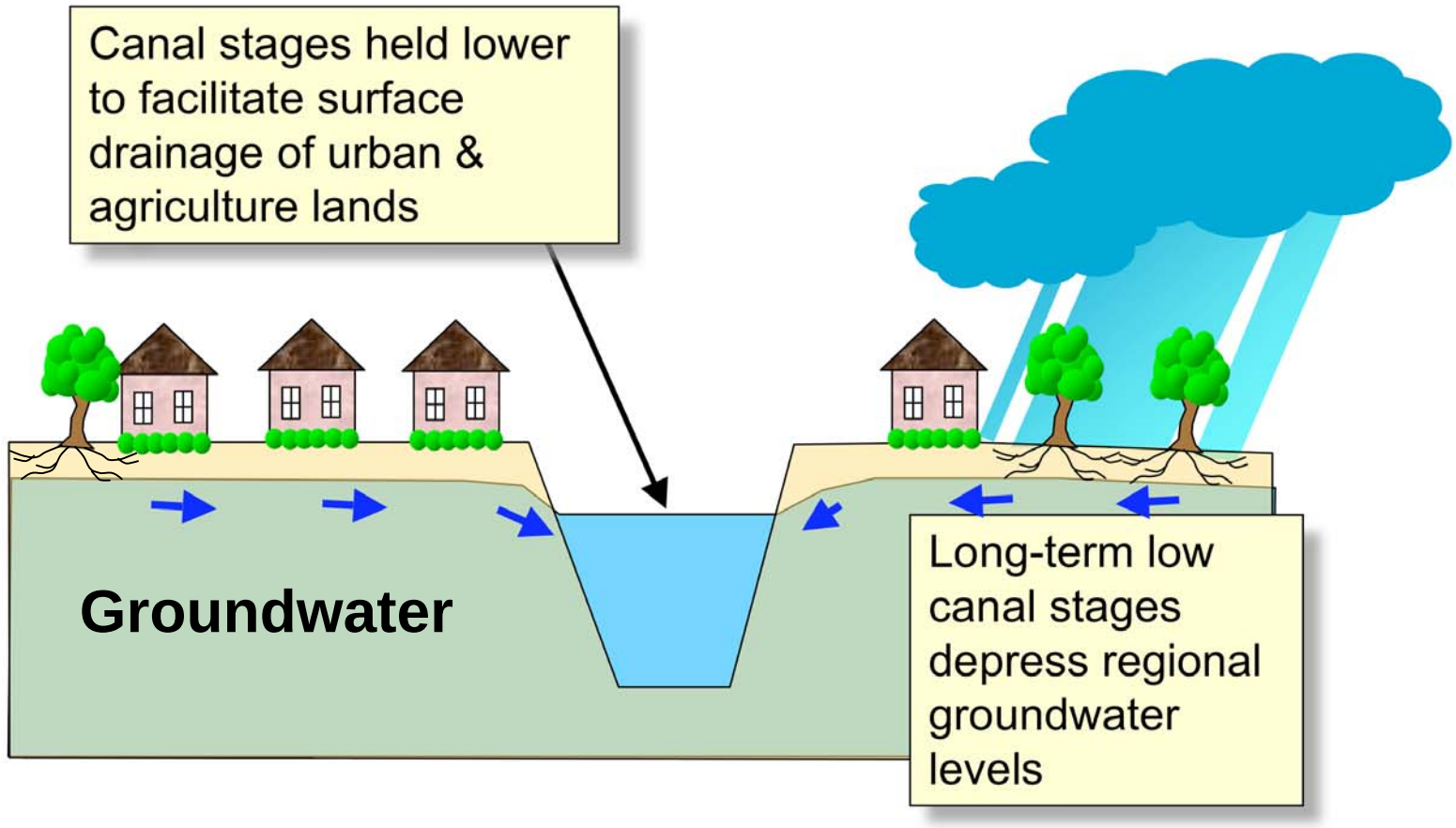
1. **Flood Control**
2. **Water Supply**

Canal stages held high to facilitate groundwater recharge and assist supplemental irrigation



Canal / Groundwater Interaction

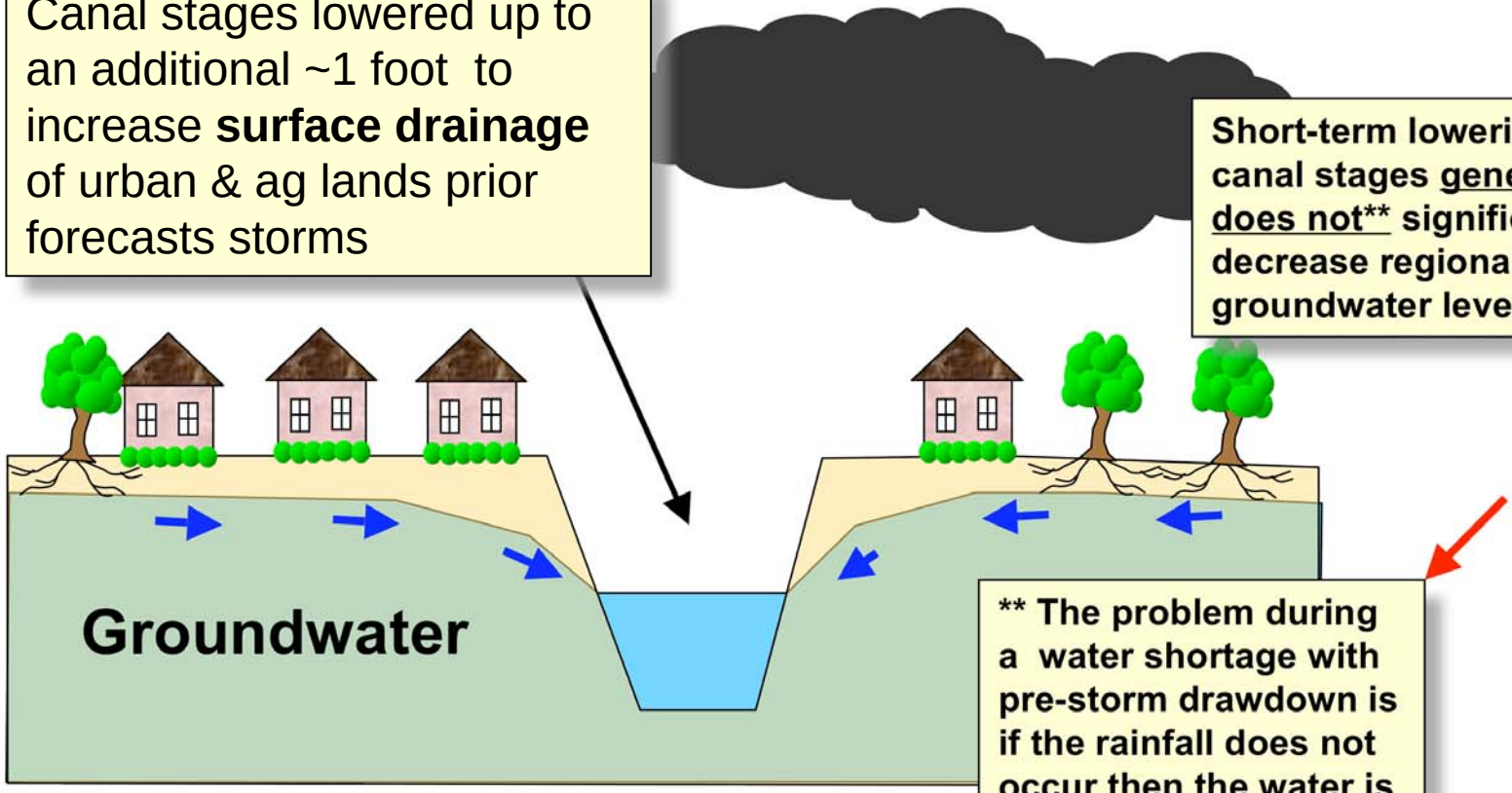
Normal Wet Season Operations



Canal / Groundwater Interaction

Wet Season Pre-Storm Drawdown Operations

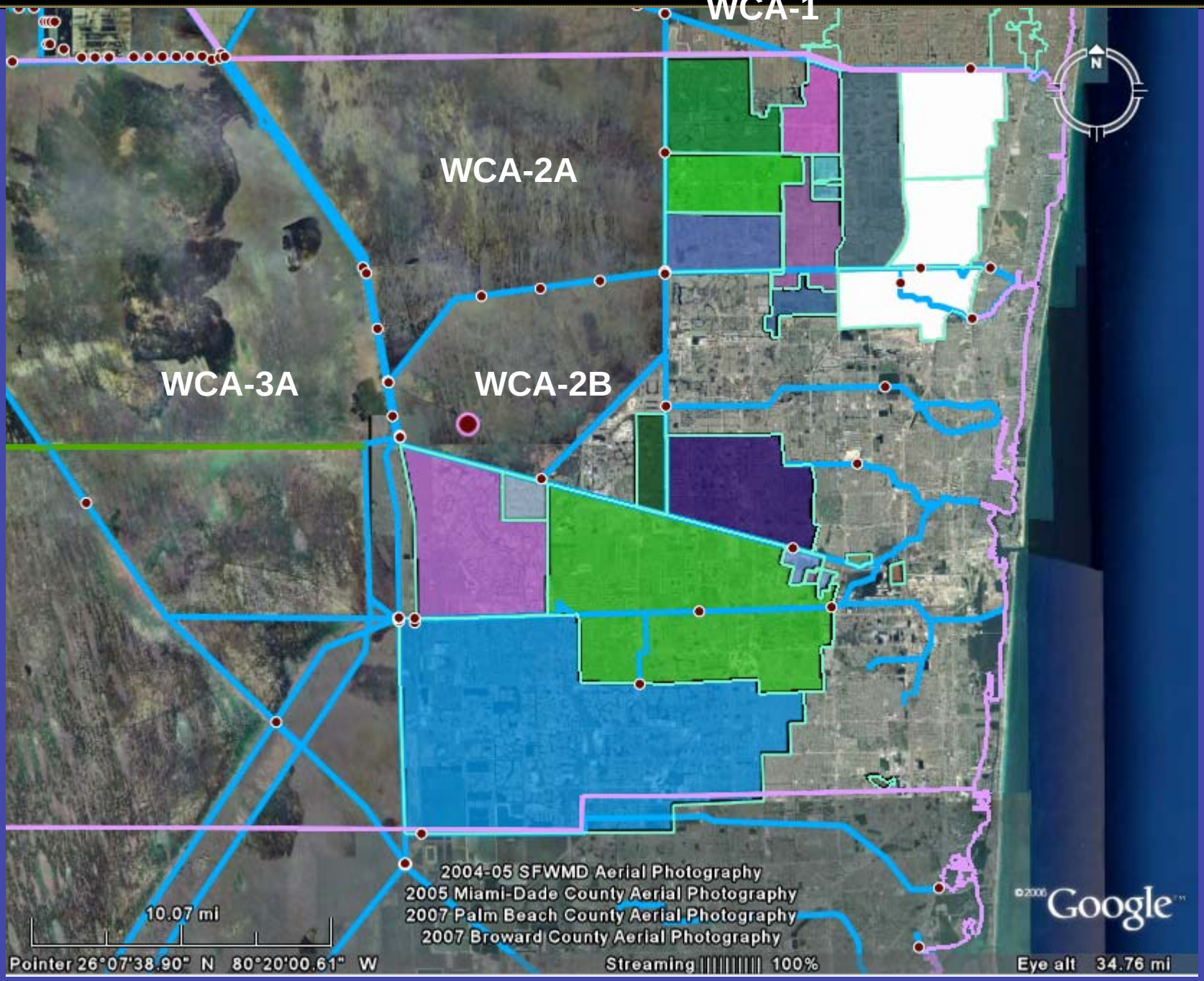
Canal stages lowered up to an additional ~1 foot to increase **surface drainage** of urban & ag lands prior forecasts storms

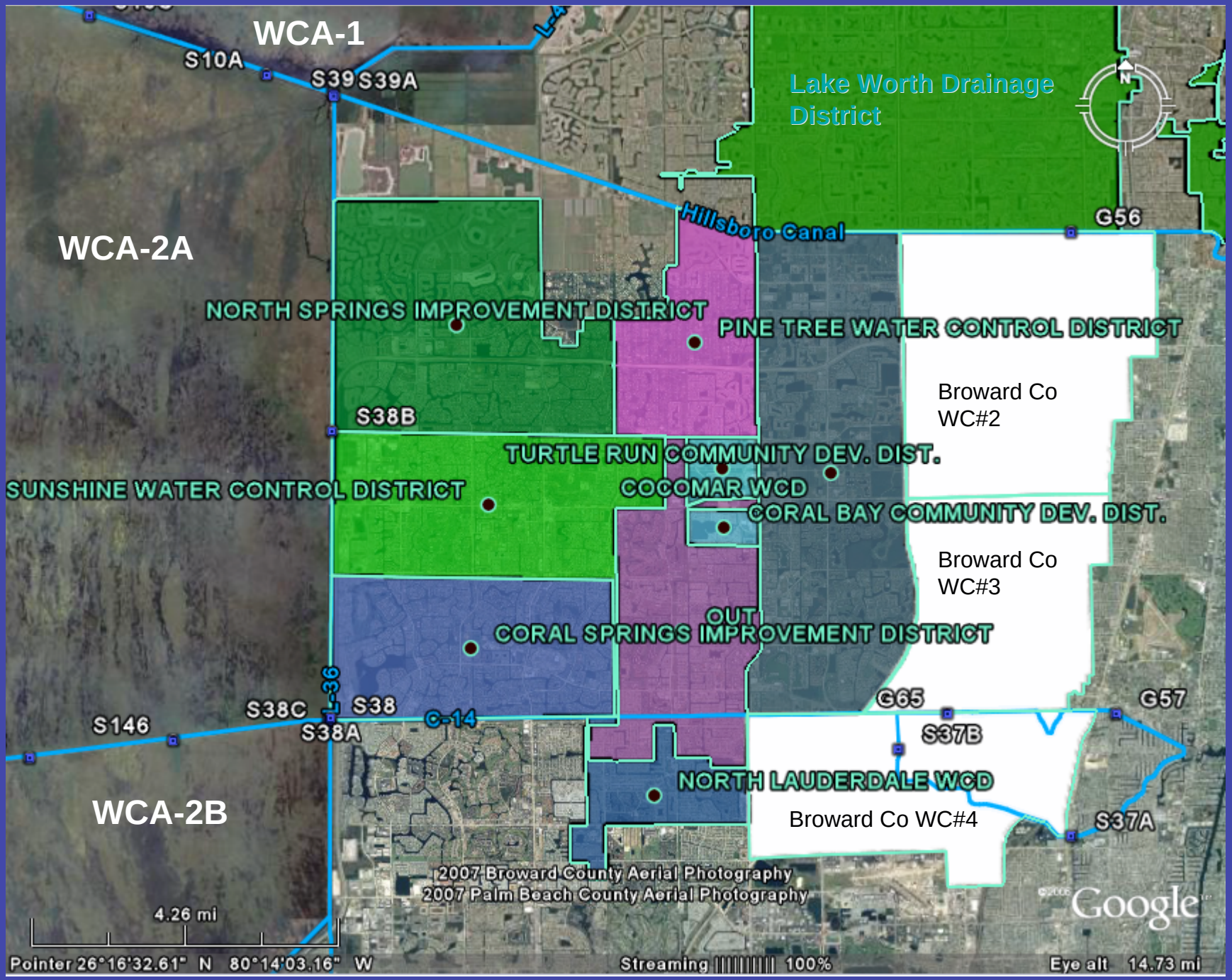


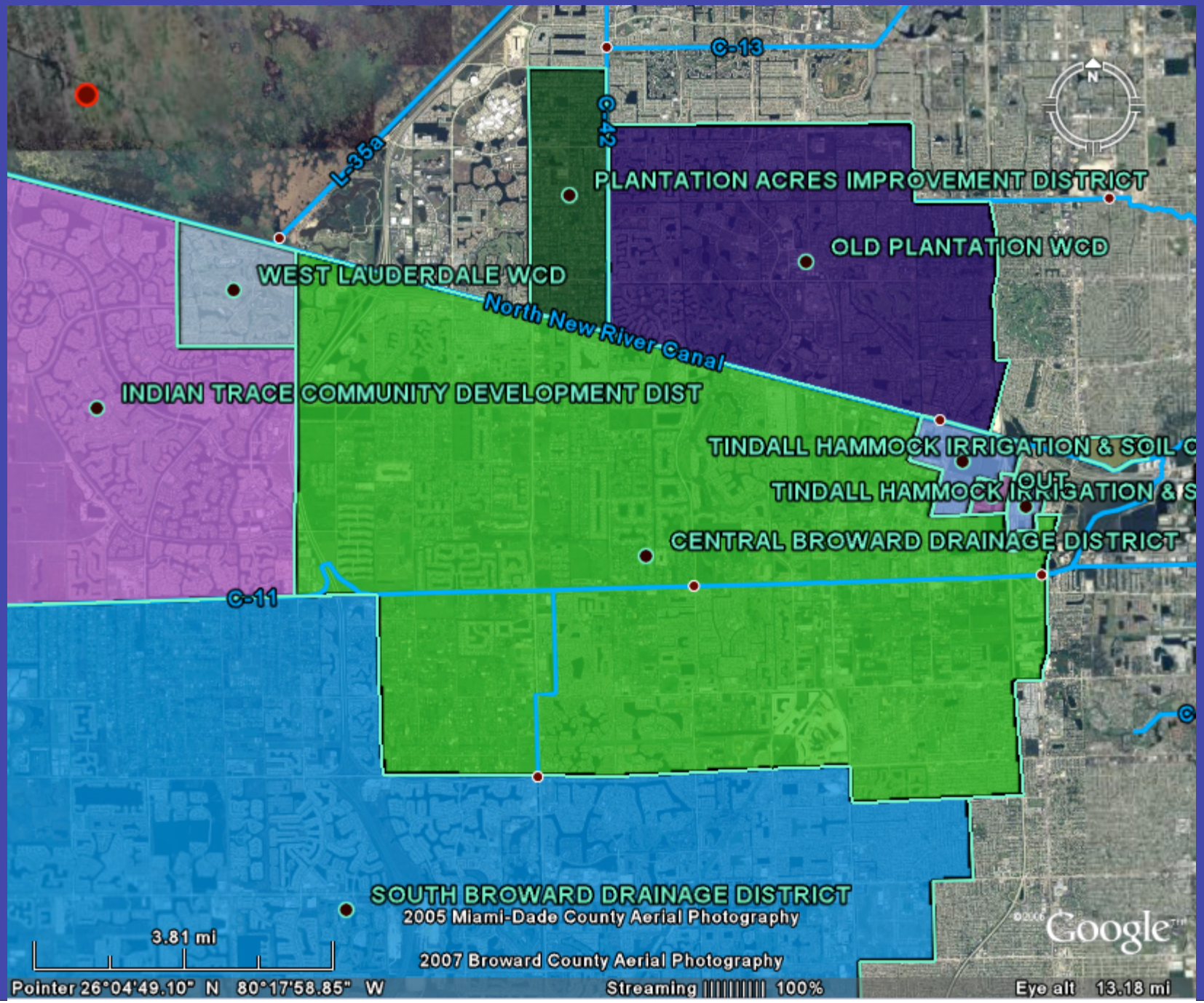
Short-term lowering of canal stages <u>generally does not</u> significantly decrease regional groundwater levels.**

** The problem during a water shortage with pre-storm drawdown is if the rainfall does not occur then the water is lost from the system.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

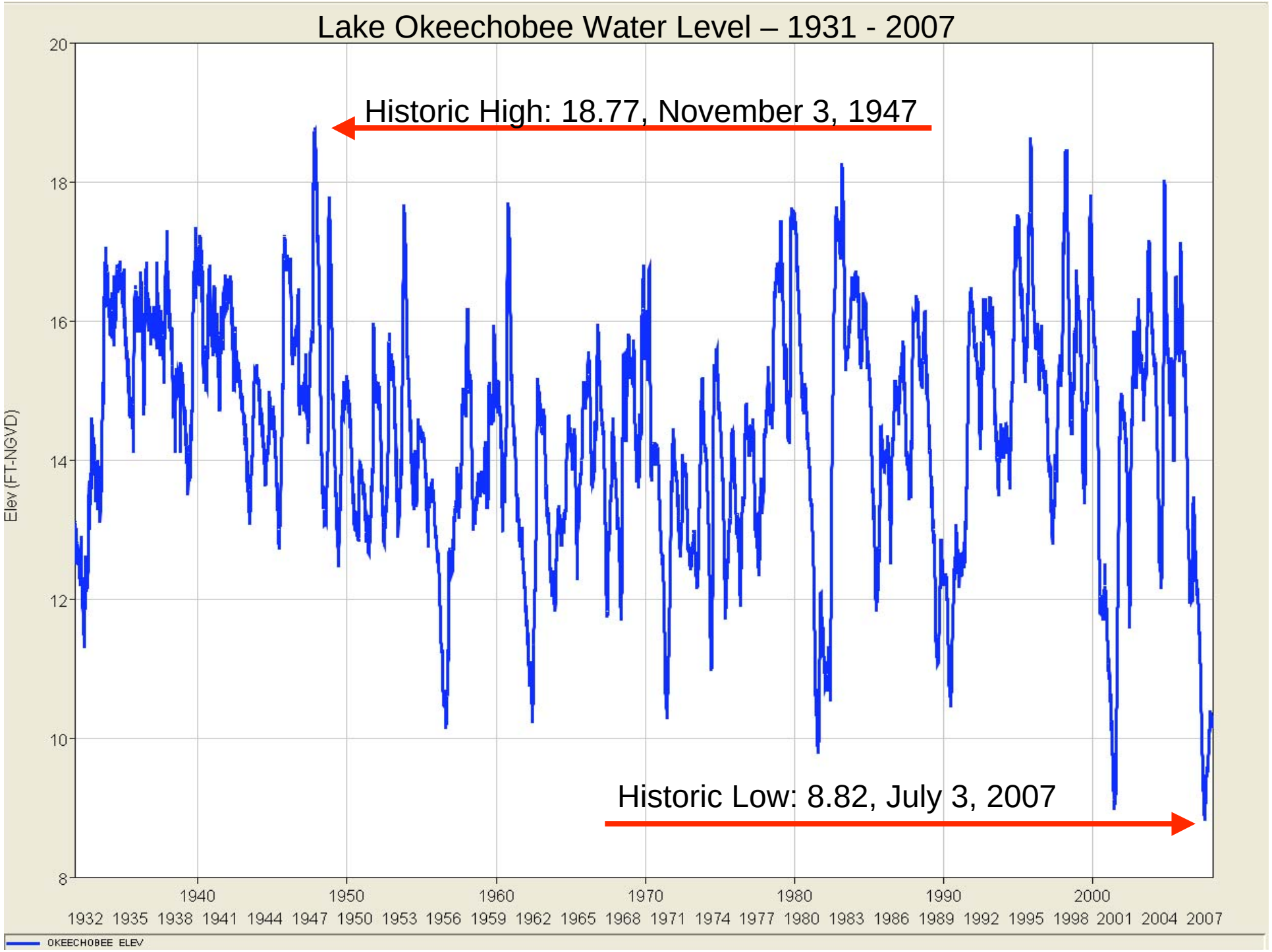



WCA-1
S10A
S39
S39A
L-4
Lake Worth Drainage District
N
WCA-2A
Hillsboro Canal
G56
NORTH SPRINGS IMPROVEMENT DISTRICT
PINE TREE WATER CONTROL DISTRICT
Broward Co WC#2
S38B
TURTLE RUN COMMUNITY DEV. DIST.
SUNSHINE WATER CONTROL DISTRICT
COCOMAR WCD
CORAL BAY COMMUNITY DEV. DIST.
Broward Co WC#3
OUT
CORAL SPRINGS IMPROVEMENT DISTRICT
L-36
S38C
S38
G65
G57
S146
S38A
C-14
S37B
NORTH LAUDERDALE WCD
WCA-2B
Broward Co WC#4
S37A
2007 Broward County Aerial Photography
2007 Palm Beach County Aerial Photography
4.26 mi
Google
Pointer 26°16'32.61" N 80°14'03.16" W
Streaming 100%
Eye alt 14.73 mi


C-13
C-42
L-35a
PLANTATION ACRES IMPROVEMENT DISTRICT
OLD PLANTATION WCD
WEST LAUDERDALE WCD
North New River Canal
INDIAN TRACE COMMUNITY DEVELOPMENT DIST
TINDALL HAMMOCK IRRIGATION & SOIL C
OUT
TINDALL HAMMOCK IRRIGATION & S
CENTRAL BROWARD DRAINAGE DISTRICT
C-11
SOUTH BROWARD DRAINAGE DISTRICT
2005 Miami-Dade County Aerial Photography
2007 Broward County Aerial Photography
3.81 mi
Pointer 26°04'49.10" N 80°17'58.85" W
Streaming 100%
Eye alt 13.18 mi
Google

South Florida Water Resource Management Challenges

- Florida's climate is one of "extremes"
- System stressed by population & land use
- Current C&SF System can not be operated to meet all the water resource objectives of the region
- BALANCE
  - Multiple water resource objectives
  - Objectives often conflict
  - Changing land uses (ag to urban)


Lake Okeechobee Water Level – 1931 - 2007
Historic High: 18.77, November 3, 1947
Historic Low: 8.82, July 3, 2007
Elev (FT-NGVD)
20
18
16
14
12
10
8
1940
1950
1960
1970
1980
1990
2000
1932 1935 1938 1941 1944 1947 1950 1953 1956 1959 1962 1965 1968 1971 1974 1977 1980 1983 1986 1989 1992 1995 1998 2001 2004 2007
OKEECHOBEE ELEV

Questions?